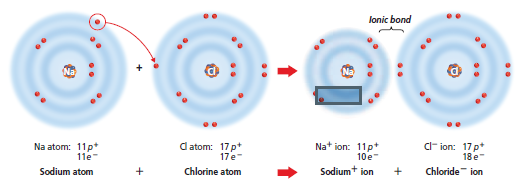
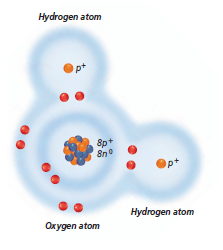
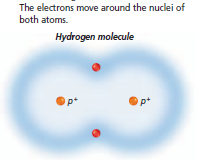
7 A view of the cell

1. Identify the parts of prokaryotic and eukaryotic cells
2. ID the structure and function of plasma membrane
3. Relate structure of cell parts to their function
4. <http://www.glencoe.com/sec/science/cgi-bin/splitwindow.cgi?top=http://www.glencoe.com/sec/science/top2.html&link=http://www.cellsalive.com>
5. Labs-
   1. use of microscope
   2. measuring with a microscope
   * compare cell types pg. 188

* Ionic bond
* 
* Covalent Polar Covalent
* 

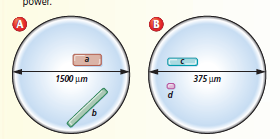
# The Discovery of Cells

## 7.1 History of the Cell theory- curses; microscopes

### Light microscopes.; Leeuwenhoek;1600’s -1st simple microscope;

* **Compound-** uses series of lenses to magnify up to 1500 X. see 1064
* **MINILAB &7.1 measuring with a microscope**

Viewing area of microscope is 1.5 mm (or 1500 µm) on high & 0.375 mm on low

a. is 400 µm

### The cell theory

* Robert Hooke- 1600;sused compound light microscope to study cork- Name CELLS
* Mathias Schleiden – plants are made of cells; 1830’s
* Theodor Schwann- animals made of cells; 1830’s

Together gave the **cell theory.**

* all organisms are made of one or more cells
* The cell is the basic unit of structure and organisms

### All cells come from preexisting cells (cells divide to form 2 identical cells

### Electron microscopes

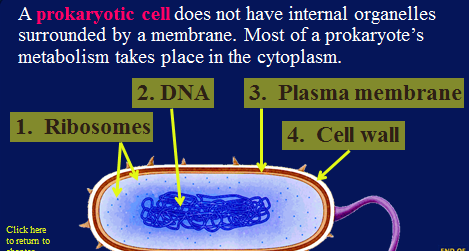
1930-40’s- beam of electrons magnify up to 500 000 X ( must be in a vacuum)

* Scanning electron m. SEM- scan surface- provide 3D image
* Transmission electron m. TEM- study structures inside a cell
* STM- Scanning Tunneling M- create computer images of atoms of surface of molecule
* Dyes can improve contrast
* Need to know how to measure under a microscope.

## 2 Basic Cell Types

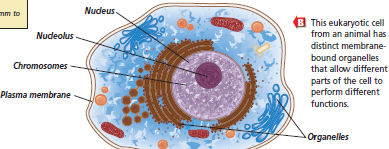
### Organelles- specialized structures – usually surrounded by membranes

### Prokaryotes- Do not contain membrane-bound structures.

Most unicellular organisms like bacteria are prokaryotic

### Eukaryotes- have membrane bound organelles- may be single (like amoeba) or multicellular.

**Nucleus**

Robert Brown observed

Virchow – id structure responsible for cell division

Manages or controls cellular functions

# 7.2 The plasma Membrane- gateway

## Controlling the flow- must maintain balance in cell of internal & external conditions-

## Maintaining a balance survival depends an cell’s ability to maintain proper conditions within itself

### Why cells must control materials- needs glucose, amino acids & lipids no matter what external conditions are & get rid of them and waste when they are in levels that are too high HOMEOSTASIS-maintaining balance.

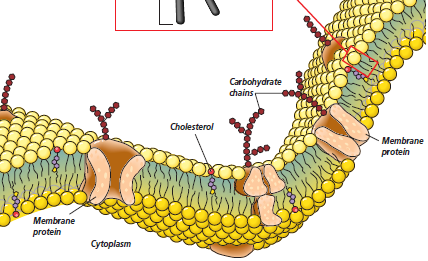
**Selectively permeable- water passes through freely but sodium & calcium in limited time and amounts-through certain channels**

## Structure of the Plasma Membrane- Fluid Mosaic Model

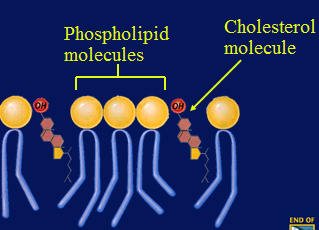
## Lipids - are large molecules composed of 3 fatty acids-and glycerol

## Phospholipids -are composed of lipids where a phosphate group replaces a fatty acid

### The phospholipid bilayer

 A phospholipid bi-layer with proteins – both free to move within membrane (like boat on water)

2 fatty acid tails are nonpolar

* The head (with the phosphate group is polar
* Tails avoid water
* Fatty acid tails to inside of membrane- away from watery environment on the outside
* Cell membrane forms barriers that are water-soluble on the outside and insoluble in the middle.
* Prevents water soluble molecules from moving through easily.

### Other components of the plasma membrane

Cholesterol helps to stabilize the phospholipids in the plasma membrane by preventing their fatty acid tails from sticking together

High levels of cholesterol related to reduced blood flow

It is critical in stability of plasma membrane

Transport Proteins- move larger molecules through membrane

Outer proteins - help ID chemical signals which help protect cells from infection

Inner proteins- attach the plasma membrane to the cell’s internal support structure giving cells its flexibility.

# Eukaryotic cell structure- ID something in everyday life that functions in the same way.

## Cellular Boundaries

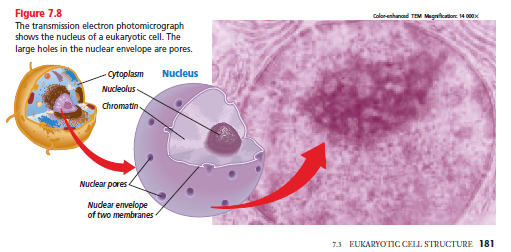
Plasma membrane- decides what resources is necessary; selectively permeable- fluid mosaic- ALL CELLS

### The cell wall- rigid- outside plasma membrane; provides support (shape) & protection; in plants- cellulose; allows materials to pass through- very porous- DOES NOT SELECT WHAT GOES THROUGH

## The nucleus and cell control-nucleus; contains directions (DNA blueprints) to make proteins- so it controls the acidity of the organelles.

**Chromatin-** strands of DNA that cannot be seen in the nucleus; they thicken, (become visible) becoming chromosomes during cell division.

* Nucleolus- in the nucleus- makes ribosomes
* Ribosomes- produce proteins- made of RNA & protein-
* DNA stays in nucleus. The Ribosomes leave nucleus & enter cytoplasm carrying- DNA code inside - translated to RNA ;
* Cytoplasm- clear fluid in cell- **suspends the cells organelles.**
* Ribosomes and translated RNA are transported to the cytoplasm through the nuclear envelope- a structure that separates the nucleus from the cytoplasm
* Nuclear envelope- a double membrane make up of 2 phospholipid bilayers with small nuclear poles. Ribosomes pass through the pores.



The proteins are made- now they need to be packaged.

## Assembly, transport, and storage

Ribosomes- make proteins; each protein has specific function, producing parts of the cell (membrane, …) (like parts of the body; cell organelles have their own function) can be found floating free or on ER.

* Endoplasmic reticulum- ER- site of cellular chemical reactions; Folded membranes- providing large surface area;
* Rough ER- have ribosomes attached- carry out protein synthesis
* Smooth ER- no ribosomes; site of biochemical reactions; include production & storage of lipids

### Organelles for assembly and transport of proteins

* Golgi Apparatus- flattened sacs; modify proteins; sorts them into membrane-bound packages called vesicles to be sent out (like post office)

### Vacuoles and storage

Vacuoles; membrane bound- temporary storage; food, enzymes, etc. store waste

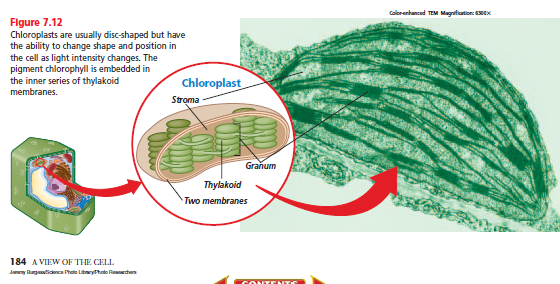
Animal cells usually do not contain vacuoles- if so- they are much smaller, but may have many.

### Lysosomes and recycling

* Lysosomes- contain digestive enzymes- digest worn out , food, engulf viruses & bacteria
* The membrane around lysosomes prevents the enzymes from damaging the cell.
* Lysosomes can fuse w vacuole, release enzymes which digest; also tadpole tail

## Energy Transformers

### Chloroplast and energy

* Chloroplast- capture light & convert it to chemical energy; Double membrane
* Inner thylakoid membranes where sunlight is trapped in stacks of membranous sacs called grana- Fluid around the stacks is stroma)
* Plastids- organelles used for storage; ex. May contain starches, lipids or pigments.
* Named according to their color or pigment they contain
* Chloroplast contains pigment chlorophyll.
* Chlorophyll traps light energy- green color

### Mitochondria and energy

Mitochondria- membrane bound organelles in plant & animal cells that transform chemical energy in the bonds of sugar molecules to ADP & ATP-the cells energy molecules

Outer membrane and inner folded membrane. Energy storing molecules are produced on the inner folds

The number of mitochondria in a cell depends on what type of cell it is (liver vs. muscle)

## Organelles for support and locomotion

### The cytoskeleton

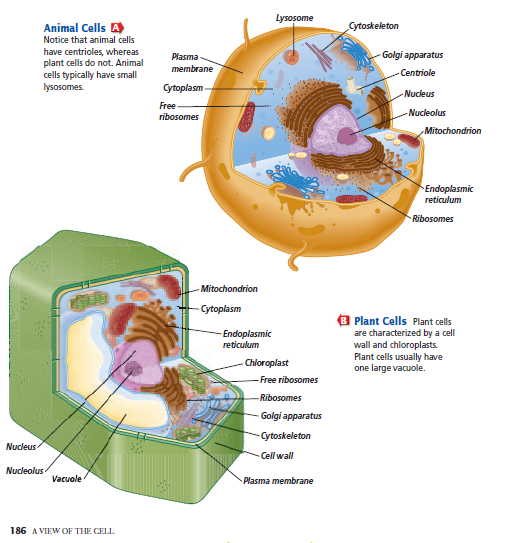
Cytoskeleton- support framework; constantly changing structure. Can be dismantled in one place and reassembled elsewhere, changing the cells shape.

Microtubules- thin hollow cylinders make of protein

Microfilaments- smaller, solid protein fibers

Both act as scaffold for anchor and support organelles; provide highway system through materials move within the cell

## Comparing animal and plant cell



### Centrioles

Centrioles- found in cells of animals and most protist, occur in pairs; made of microtubules- active in cell division

### Cilia and flagella- LOCOMOTION

Cilia- short, numerous – like short hairs- act like oars

Flagella= whip like= most cells only have 1 or 2

